USAWC STRATEGY RESEARCH PROJECT

The Army Materiel Requirements Generation Process: A Process in Need of Change

by

Colonel Harold J. Greene
United States Army

Colonel James H. Thomas
Project Advisor

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (FROM - TO)
07-04-2003		xx-xx-2002 to xx-xx-2003

4. TITLE AND SUBTITLE
The Army Material Requirements Generation Process: A Process in Need of Change
Unclassified

5a. CONTRACT NUMBER
5b. GRANT NUMBER
5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Greene, Harold J> ; Author

5d. PROJECT NUMBER
5e. TASK NUMBER
5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME AND ADDRESS
U.S. Army War College
Carlisle Barracks
Carlisle, PA17013-5050

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME AND ADDRESS
,

10. SPONSOR/MONITOR'S ACRONYM(S)
11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
APUBLIC RELEASE
,

13. SUPPLEMENTARY NOTES

14. ABSTRACT
See attached file.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE	Same as Report (SAR)	34	Rife, Dave RifeD@awc.carlisle.army.mil
Unclassified	Unclassified	Unclassified			19b. TELEPHONE NUMBER International Area Code Area Code Telephone Number DSN

ABSTRACT

AUTHOR: COL Harold J. Greene

TITLE: The Army Requirements Generation Process: A Process in Need of Change

FORMAT: Strategy Research Project

DATE: 07 April 2003 PAGES: 34 CLASSIFICATION: Unclassified

The Army has failed to transform the materiel requirements determination process during the post-Cold War drawdown. A series of evolutionary changes to the process has resulted in a dysfunctional system that is overly complicated, duplicative and executed by an understaffed workforce. As a result, the intent of the Chief of Staff of the Army to transform the Army is hamstrung by a non-responsive system. This paper reviews the current process and its origins. The system is then compared to the system required to support a transforming Army in a period of great technological and doctrinal change. A proposal for a transformed system is presented.

TABLE OF CONTENTS

THE ARMY MATERIEL REQUIREMENTS GENERATION PROCESS: A PROCESS IN NEED OF CHANGE

The Quadrennial Defense Review[1] (QDR), National Security Strategy[2] and the draft National Military Strategy[3] all call for the transformation of the armed forces. The activities of the requirements generation system are crucial to transformation. This system identifies the future mission needs of the warfighter and provides the documentation that guides the development of materiel capabilities to transform the armed forces.[4] These documents also serve as the basis for funding in the PPBS system, provide the basis for testing and fielding of the system in the acquisition process, and insure interoperability among systems. A functioning requirements generation process is essential for Army transformation to succeed.

Innovation in processes is one of the pillars of the Secretary of Defense's 2001 Quadrennial Defense Review.[5] Requirements generation is one of the processes requiring innovation. The FY 2002 Defense Appropriation Bill contained specific language expressing congressional concern with the requirements generation process in the Army.[6] The language called on the Army to "significantly reform and streamline its requirements generation" process. The bill cites a study by the Center for Naval Analyses (CNA) directed by Congress in the FY 2001 appropriations bill. The CNA "report cites an unrealistic requirements determination process to which there are too many contributors and which does not facilitate the orderly prioritization of requirements". The report also accuses the Army of being "fractionalized along branch lines." The report goes on to note that the Army uses 2200 people to develop requirements while the Air Force uses about 1600 and the Navy only 550.[7] After nearly 10 years of working with the requirements generation system in the Army, I concur with the CNA analysis.

Despite the motivation provided by the CNA report and the call for transformation in processes, the Army has failed to transform the requirements generation system used within the Army. I am convinced that the requirements generation process in the Army is in need of revolutionary change. The existing system is not appropriate for the transformation underway in the Department of Defense (DoD), is poorly understood, duplicative, resource intensive, not responsive and lacks adequate resources. This paper will outline the deficiencies with the current system, provide examples of challenges encountered using the current system and propose solutions.

THE IMPACT OF TRANSFORMATION ON THE REQUIREMENTS GENERATION SYSTEM

The lack of integration of efforts across the services is the most common criticism of the transformation efforts to date. Multiple GAO studies[8] note that DoD's transformation goals were not linked to transformation efforts. Roles and responsibilities are not clearly defined. Yet, the civilian and military leadership of the department have clearly stated that the effectiveness of the transformed force will depend heavily on an integrated joint solution.[9] The draft National Military Strategy emphasizes this with a call for a joint vision which provides an operational architecture for developing and employing new capabilities in innovative ways.[10] In spite of these calls for a joint vision and architecture, no process is in place to drive the services and the department toward such a solution. While the QDR calls upon each service to develop a service transformation plan, it does not levy a requirement upon the department to develop a joint transformation plan to guide the services.

The services each developed transformation plans that did not provide a coherent plan for the DoD as a whole. For example, the GAO in reviewing the Army transformation plan noted "the lack of an overall Department of Defense transformation strategy has led the Army to proceed with its transformation plans solely on the basis of broad departmental guidance rather than a clear understanding of how its efforts fit into an overall scheme for military transformation."[11] A similar criticism came from Krepinevich[12] and Vickers[13] from the Center for Budgetary and Strategic Analysis (CSBA) who note the absence of operational concepts for the goals of the QDR.[14] These joint operational concepts are needed to determine whether a new capability is transformational. As Vickers states, "DoD's transformation investment decisions may be severely handicapped by the absence of plausible service, joint, and interagency operational concepts to address the transformation challenges described in the QDR." Without these concepts, the services naturally gravitate toward existing doctrine and service practices. In the Army, gravitation toward existing doctrine and service practices leads to organization and development along the lines of the existing branches and proponents.

Krepinevich and Vickers propose developing operational concepts around the six key challenges in the QDR. They believe this would lead to cross-service solutions vice the individual service program solutions in the current budget. Similar recommendations are found in an ongoing assessment of service transformation roadmaps, available in draft form, from the National Defense University's Center for Technology and National Security Policy.[15] The assessment calls for the services to approach transformation jointly and to integrate their efforts into a unified plan. Clearly, without efforts to develop joint constructs, the current process will undermine the Army's attempts to develop requirements that fit into a joint architecture.

Change in the process at the DoD and Joint Chiefs of Staff (JCS) level appears imminent. The Quadrennial Defense Review called for capabilities based requirements to guide development of the future force.[16] In the summer of 2002, the head of the Office of Program Analysis and Evaluation at OSD called for reviewing programs in a capabilities based context and not on an individual program basis.[17] Many of our senior defense and Army leaders have expanded on this by calling for the development of interoperable systems of systems to provide these capabilities in the future force.[18] The system of systems approach is intended to provide an integrated joint solution. The civilian and military leadership of DoD clearly believe that the effectiveness of the transformed force depends on an integrated joint solution.[19]

Achieving a truly integrated, capabilities based system requires a top down flow of requirements and analysis of subordinate requirements in the context of the larger system. GEN Peter Pace, Vice Chairman of the Joint Chiefs of Staff (VCJCS), proposed using the Joint Requirements Oversight Council (JROC) to identify gaps in capabilities and specify a lead service to develop solutions.[20] In recent statements, GEN Pace proposed that the JROC provide "top-down umbrella guidance."[21] An operational architecture and a derived list of required capabilities for the future force from which operational requirements can be generated is not available today at either the Department of Defense or Department of the Army level. GEN Pace has proposed that the JROC would start a "top down, not bottom up approach" to generation of requirements that would address this shortfall.[22] This contrasts with the current bottoms up approach with the JROC reviewing requirements generated by the services.

These forthcoming changes in process demand a change in the Army process of developing requirements. Just as the JROC will provide top down guidance, the Army should do the same. The challenges of developing requirements to support as yet undefined joint transformation plans is exacerbated by the Army process. Just as the joint staff has no overarching plan or architecture for transformation, neither does the Army. The current process within the Army mirrors the joint approval process with requirements flowing up. In the Army case, the requirements flow up from the combat developers in the Training and Doctrine Command (TRADOC) proponent schools.[23]

For the Army to develop integrated solutions, a top down flow of concepts and capabilities is required at the Department of the Army level. This capabilities plan should be based on an analysis of DoD required capabilities to allow the development of requirements as part of a truly integrated system of systems. This process could mirror the process proposed by GEN Pace for the JROC.

Development of a system of systems implies the need for a top down systems engineering approach to development of requirements. A systems engineer is required to provide the systems architecture and the interfaces for development of the system of systems. Once this overarching architecture and the interfaces are defined, subordinate systems can be developed. The Department of the Army (DA), based on an analysis of DoD required capabilities, could follow the systems engineering approach. The approach should start with a capabilities analysis, also known as a requirements analysis in Systems Engineering. An allocation of requirements to subordinate systems to form an integrated architecture should follow. Such a process would provide a joint, system of systems by design.

Contrast a systems engineering approach to developing the future force with the current Army process for development of requirements. Without an overarching architecture, action officers at TRADOC schools develop requirement documents that then flow up through the proponent to TRADOC, DA and eventually the JROC. Each level of command evaluates the requirements to determine if they meet the perceived architecture and future force requirements. The Department of the Army primarily engages in the approval process after requirement development. Attempts to synchronize requirements are largely reactive, occurring during the approval process, rather than designing them into a system of systems from the beginning.

The Crusader cancellation illuminates the impact of not having a top down flow of capabilities leading to requirements. The Army foresaw a role for the Crusader in the future force and the President included it in the 2003 Presidential budget submission. Deputy Secretary of Defense Wolfowitz in April 2002 Congressional testimony described the Crusader as between a legacy system and a transformational system and pointed to difficulties in defining "transformational" qualities.[24] The Army strongly defended the Crusader as providing capabilities required in the transformed force. Nonetheless, approximately a month later, Secretary Rumsfeld cancelled the program and stated that the Crusader was not transformational.[25] Had the Crusader requirement derived from a Joint Chiefs of Staff and Army objective force capability analysis, clear linkages to transformation would have existed.

Another reason for looking at a top down driven process for requirements generation is the interaction required with the Planning, Programming and Budgeting System (PPBS) and the Acquisition System to bring a concept to fruition. Of these three systems, PPBS and the Acquisition System are both driven from the top down. The Deputy Chief of Staff for Programs, G8 directs the programming efforts and the acquisition efforts are directed by the Assistant Secretary of the Army for Acquisition, Logistics and Technology. In contrast, the requirements

system, which is intended to provide inputs to both these systems, flows up from TRADOC proponents to DA. If DA is to synchronize these systems most efficiently and effectively, requirements generation should also be a top down driven system with the lead at DA level.

THE CURRENT REQUIREMENTS GENERATION SYSTEM

The requirements generation process provides the documentation for materiel solutions. Detailed procedures guide the process and demand voluminous documentation. Unfortunately, the past few years have seen rapid changes in the process and required documentation. At all levels, multiple changes to the process were promulgated with memorandums. The net result of the quantity and frequency of the changes is a poorly understood and inefficient process.

At the joint level, Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01B governs the materiel requirements generation process.[26] This instruction provides the format for requirements documents, particularly Mission Needs Statements (MNS), Capstone Requirements Documents (CRDs) and Operational Requirements Documents (ORDs). Mission Needs Statements are used to provide statements of broad capability required in the force. These capabilities may be met by solutions derived from changes to Doctrine, Organization, Training, Leader Development, Materiel, Personnel or Facilities (DOTLMPF). After analysis of the possible solutions, an Operational Requirements Document is prepared if a materiel solution is appropriate. In addition, a Capstone Requirements Document is required for solutions that involve systems of systems.

CJCSI 3170 was published in 1999, revised in 2001 and is currently under revision yet again. Interestingly, the latest change to the CJCSI 3170 came in a memorandum from the Joint Staff dated 7 October 2002 canceling the required submission of MNS and CRDs.[27] The MNS will be replaced by a “mission area focused and capabilities based document” and the CRD by “mission area integrated architectures” in the next publication of CJCSI 3170.[28] From these descriptions, it appears that the next version of CJCSI 3170 will move toward providing a process for top down development of requirements.

The procedure for processing requirements documents is covered by CJCSI 3170 and Chairman of the Joint Chiefs of Staff Instruction 5123.01A, Charter of the Joint Requirements Oversight Council (JROC).[29] The JROC provides the forum for approval of requirements documents (ORDs and previously MNS and CRDs). Requirements documents for all Acquisition Category (ACAT) I programs[30] as well as all programs with joint interest are approved by the JROC. Those Army requirement documents requiring JROC approval pass through the Army requirements generation process and are then forwarded to the JROC.

Given the additional work required for JROC staffing, combat developers frequently try to avoid exceeding the cost thresholds associated with ACAT I, designation as a joint program or development of CRDs, all of which require JROC approval. Despite the desire for system of systems solutions, the extra bureaucracy associated with CRDs discouraged their use. I experienced this personally while chairing the Integrated Concept Team (ICT) for Demolitions and Engineer Munitions. Charged with developing the requirements for an interoperable family of demolitions to support future operations in constricted terrain, the ICT was encouraged by the Army Special Operations Command representative to pursue a CRD. He proposed a CRD to define the system of demolition components for the future instead of defining each piece individually. Both the TRADOC staff officer and the DA staff officer for engineer requirements discouraged a CRD. A CRD would not replace any of the existing documents and would require JROC approval that would not otherwise be required. Further, CRDs do not support funding and thus do not add any apparent benefit while requiring additional work. We opted not to develop a CRD despite a recognized need for a system of systems approach to a materiel solution.

The requirements generation process within the Army is difficult to understand. The system lacks coherent and current documentation of the process. Army Regulation (AR) 71-9 entitled Materiel Requirements[31] is dated 30 April 1997. CJCSI 3170 has undergone two revisions since this regulation was approved. The Army has also issued numerous memorandums with clarifying guidance in the interim.[32] Within TRADOC, the organization charged to prepare requirements documents, the governing document for requirements development is TRADOC Pamphlet (PAM) 71-9[33] also dating from 1997. TRADOC, like DA, has issued numerous memorandums modifying the process.[34] If the changes involved were minor, perhaps this would not present a challenge. Unfortunately, the changes are numerous and some of them are major. The result is a poorly understood process requiring research from multiple sources in order to understand and operate within the system.

The most significant change in the process involved changes to the requirements approval process. From 1995 until March of 2001, the TRADOC Commander was charged to approve requirements documents within the Army. DA catalogued requirements documents and prioritized them for funding. TRADOC was expected to staff the documents with the various stakeholders in the Pentagon, but the document was formally approved at TRADOC. On 19 March 2001, the Chief of Staff, Army issued new guidance returning approval authority for all Army requirements to the department level.[35] He also directed the formation of an Army Requirements Oversight Council to advise him and serve as a senior review forum for

requirements. A memorandum from the Army G3 followed on 12 April 2001, providing interim implementing guidance pending publication of a new AR 71-9.[36] Publication of an updated AR 71-9 is still pending. Further, TRADOC posted a voluminous draft TRADOC PAM 71-9, a tome of 449 pages, on the Internet. The publication was never finalized and is still on the TRADOC web site at this writing.[37] The best reference to date on the process is an unofficial TRADOC publication on ORD development dated 24 October 2002.[38] Unfortunately, the recent decision to eliminate the CRD and MNS has already made this document obsolete.

In addition to the change of approval authority, the system has had a number of minor changes. None of the individual changes created a large impact, but taken collectively they created confusion. They also adversely affected the motivation of those working in combat developments. Many times I heard the comment that we did not need to complete a document because the process would likely change before we completed it. One of my former employees at the Maneuver Support Center (MANSCEN) found humor in the rate and number of changes to the process. He began tracking them in August 1999. In three years, he received twenty separate documents with interim guidance, changes to regulations or instructions, or clarifications.[39] The changes ranged from formatting changes on ORDs to specification of new Key Performance Parameters (KPP) required in all ORDs. In all cases, the guidance required the incorporation of the changes immediately.

The Joint Staff addition of a requirement for an Interoperability KPP and a cost requirement caused a particularly large amount of turbulence. The Joint Staff directive required updated ORDs prior to the next acquisition milestone decision.[40] The Army went well beyond this by directing updating of all requirements documents for any system with funding in the Program Objective Memorandum (POM). The Department of the Army set a deadline of 1 October 2000 for the completion of ORD updates with funding at risk for programs failing to meet the deadline.[41] This provided a mere seven months to update all documents. These documents required the same staffing process as a brand new requirement. As an example of the impact this directive had, the Engineer proponent had 73 systems requiring updated ORDs.[42] Fifteen of these systems were past the last milestone decision and in procurement, but these programs were not granted an exception. Each ORD was estimated to require at least a year of effort by a dedicated action officer to complete,[43] yet no additional resources were provided to meet this surge in workload. Nonetheless, work began on numerous ORDs while an exception to policy was forwarded through TRADOC to DA. No response was ever received on the exception to policy request; however, TRADOC did issue implementing guidance on 22 May 2000. The guidance called for the updating of all requirements documents

by March 2001, but provided exceptions for programs in production.[44] This guidance was based on an agreement with the Department of the Army staff to only update ORDs for those systems approaching milestone decisions. Unfortunately, this was never published or publicly endorsed by the Department of the Army.[45] Many in the acquisition and programming communities continued to operate under the original guidance from DA. This created additional work and confused priorities.

The Ultra-Lightweight Camouflage Net System (ULCANS) provides a good example of the inefficiencies caused by the numerous changes.[46] Development of ULCANS began in October 1991 based on a Required Operational Capability (ROC) document. The ROC format preceded the Operational Requirements Document, but served the same purpose. A number of variants of ULCANS were developed based on the different vegetation patterns around the world. The first version, woodland, was approved for production and type classified in Jul 1999. Based on the DA guidance to update all ORDs before 1 Oct 2000, work began in earnest to develop an ORD to support funding and full production. The ORD was developed, staffed using the required staffing list and forwarded by the Commandant of the Engineer School as the proponent. The ORD reached TRADOC Headquarters in February 2001. At this point, a disagreement emerged between the action officer at DA G8 who believed an ORD was required based on DA guidance and the TRADOC HQ action officer. The TRADOC HQ action officer, following TRADOC guidance, did not believe an ORD was required and took no action on the ORD. The utility of the document for system development was minimal since the woodland variant was already approved for production and the desert variant was nearly complete. The issue still remained of the DA directive requiring an updated ORD to support funds in the POM and milestone decisions. In February 2002, as the desert variant approached a production decision, the milestone decision authority requested an updated requirements document in accordance with the DA guidance. The ORD had been at TRADOC HQ for a year during which the ORD format had changed. Due to the extended time since the original staffing and the change of format, the action officer was directed to start over following the updated procedure and using the new format. At this writing, a new ORD is ready to go forward, but the action officers at both the Engineer School and TRADOC HQ are awaiting guidance from DA G3 on whether a new ORD is truly required. The net result of this and similar actions was a tremendous amount of wasted staff effort. This is one example of many I will present to illustrate the dysfunctional nature of the current system. The combat developments work force within TRADOC, noting the futility of the process, are cynical regarding the system and in many cases make only half-hearted attempts to complete the documents.

The many changes to the system for requirements generation have also made the system more complex. When the requirements approval authority was returned to DA, another level of formal staffing was added. To compound the situation, the interim implementation guidance added an additional step to the process.[47] The additional step required Department of the Army approval to initiate ORD development. In response, TRADOC added a requirement for approval by TRADOC Headquarters of an Operational and Organizational Concept supported by appropriate analytics prior to forwarding requests to initiate ORDs to DA.[48] Clearly requiring detailed analytic studies early in the process is a prudent request for a major investment like the Future Combat System (FCS), but the majority of requirements cover much more mundane items where detailed analytics will provide limited value. This fits in well with Carl Builder's thoughts about Army reliance on detailed analysis. "The Army's lavish support for analysis and analysts has built up a potential for quantitative analysis that is unrivaled by the other services, even though its application of analysis falls far short of its potential for illuminating and understanding Army problems."[49]

The uncertainty about the process for developing requirements is exacerbated by a lack of adequate staffing to develop detailed products. The vast majority of requirements documents are developed in TRADOC proponent school's Directorate of Combat Developments (DCD). The demand for updated ORDs, additional analytic studies and additional staff work come at a time when staffing levels in Combat Developments have dropped precipitously without a re-engineering of the process. For instance, the US Army Engineer School DCD had a total authorized strength (officers, warrant officers, enlisted, and civilians) of 150 personnel in 1991.[50] Eleven years later, in the midst of major combat developments efforts across the legacy, interim and objective forces, authorized strength was 43.[51] In 1991, 47 officers were authorized with the senior officer a Colonel. In 2002, the authorized officer strength was down to 11 officers with the senior officer a LTC. In practice, the assigned strength averaged 6 officers from 2000 to 2002.[52]

Personnel numbers are only part of the problem. A significant mismatch in skills exists also. The majority of this staffing was in mid-grade civilians (GS12) and Senior Non-commissioned Officers (NCOs). NCOs and civilians bring great historical knowledge and experience with current systems, but lack the skills of experienced field grade officers and trained analysts to develop Operational and Organizational Concepts for future systems and conduct formal studies. The changes in the requirements generation system calling for analytic studies to even request permission to develop a requirements document pose a particular challenge. In the TRADOC proponent schools where most requirements are generated,

operations research analysts are in short supply. In 1997, the Engineer School was authorized a total of 12 military and civilians analysts. By 2002, the analysis elements for the Chemical, Military Police and Engineers had been combined, but the total authorized strength for all three proponents was only 17.[53] The shortage was further exacerbated by the current officer distribution plan which provides only three military analysts total to support the three branches.[54] The requirements generation system needs either re-engineering to create efficiencies or an investment in combat developments personnel with the appropriate skills and experience.

THE CURRENT SYSTEM IN PRACTICE

A good starting point for change in the requirements generation system would be the introduction of appropriate tailoring of the process. The current system is a one size fits all approach. It mandates that all systems, regardless of where they are in the acquisition process, program risk, or ACAT level, must produce the same documents and follow the same lengthy and manpower intensive development process. This is not an efficient use of resources. As an example, DA directed the activation of a number of new engineer units under the Army National Guard Redesign Study. The inventory of scoop loaders was inadequate to field these units, so DA directed the funding and procurement of scoop loaders for these units. Army scoop loaders are commercial off-the shelf items, but the guiding requirement document was not in the current format. In order to procure commercial construction equipment, the guidance required the same documents as the FCS. Clearly, the requirements process called for tailoring. The action officer, a Sergeant First Class, with assistance was able to draft an ORD. Due to the DA direction to procure this equipment, we forwarded the ORD without an Operational & Organizational concept. It took six months to get action on the document at TRADOC Headquarters. The only significant issue raised at TRADOC HQ revolved around the organizational structure, which had been specified by DA. After proponent General Officer involvement to emphasize that the ORD was required to meet a DA directed procurement, the ORD was forwarded to DA. The total time from initiation to forwarding to DA took approximately a year and a half.[55] The ORD has spent the past eight months at DA G3 awaiting department level staffing.[56] This lengthy time is especially noteworthy given the emphasis on purchasing commercial off the shelf items like scoop loaders to reduce acquisition cycle times.

The combination of the shortage of personnel and an onerous system provide incentives to find expedient solutions. In those cases where an updated requirement document was not available, I observed the use of a number of innovative schemes. The most common tactic was the use of a Statement of Continuing Need, an option in AR 71-9 that allows the procurement of

items already in service using old requirements documents or system specifications.[57] These statements were generally accompanied by a memorandum that clarified the requirements. Generally this technique worked as long as the acquisition community and the supporting logistics and testing communities were cooperative. Clearly, this was contrary to the CSA intent of having visibility on all requirements and to the DA position that all ORDs required updating, but the combination of an unwieldy system and a lack of personnel called for unique measures.

Frequently the time from the conception of a new capability to fielding is criticized as excessive. The blame is generally placed on an unresponsive acquisition system. In practice, the process of developing a new materiel capability utilizes three interrelated systems—the requirements generation system; the Planning, Programming and Budgeting System (PPBS); and the acquisition system. The acquisition system is at the mercy of the requirements generation system to provide a valid requirement that in turn justifies funding in the PPBS system. Only after the validation of the requirement and resourcing of the requirement does the acquisition system develop a materiel solution. Frequently, the source of the extended times is not the acquisition system, but the requirements generation and PPBS systems. Three examples, one good and two bad, will illustrate this problem. The first example, providing a remote relay for the Guardrail Common Sensor system, shows that the system is capable of operating rapidly in urgent situations. Contrast this with the process undertaken to modernize demolitions and to develop the Aerial Common Sensor, the replacement for the Guardrail. These latter cases show the current system at its worst.

Guardrail Common Sensor, the Army's airborne signals intelligence collection system, provides an excellent example of the impact of the requirements generation system and the PPBS system on acquisition timelines. Guardrail is a classic spiral development system with four Battalion sets fielded (one per Corps) over a period of more than 10 years. The last two systems were fielded to III Corps and XVIII Airborne Corps with a satellite relay capability allowing the unit to conduct split based operations with only the airplanes forward. The V Corps system is older and did not contain a satellite relay capability, thus requiring the forward deployment of the entire Battalion to conduct operations. The Battalion deployed to Hungary in December 1995 to support operations in Bosnia. They remained there until Spring 1999 when the Battalion deployed to Italy to support operations in Kosovo. For more than a year prior to the deployment to Italy, the Battalion requested that the Product Manager (PM) develop and field a satellite relay capability. With a relay, the unit could redeploy the majority of the unit to Germany and conduct split based operations.[58] The PM office had neither a validated requirement nor the funding to develop a satellite relay capability.

In order to gain funding and a validation of the requirement, the PM office drafted an Operational Need Statement (ONS) for the unit. An ONS is used by field units to document immediate operational requirements for Department of the Army validation.[59] The Battalion forwarded the requirement through their chain of command, but it took the deployment to support Kosovo operations to get the ONS approved in Europe. The ONS was forwarded to DA in May 1999 and approved that same month. The ONS requested that the PM office provide an immediate solution to reduce the operations tempo on the unit. The need for this solution had existed for many years, but the various staffs couldn't, or wouldn't, forward the requirement, yet an immediate solution was demanded of the acquisition system.

The PM office and the Army Deputy Chief of Staff for Operations Systems Integrator immediately reacted to the validation of the requirement by developing a plan to temporarily reprogram funds and use excess satellite equipment to provide an interim solution. In addition, a plan for a permanent solution was developed and included in a supplemental appropriation forwarded to Congress. By the end of September 1999, funding was received via a supplemental appropriation to cover both the interim and permanent solutions. By November 1999, the interim solution was ready for operations, only six months after the requirement was validated. The unit redeployed the main body back to Germany, in time for Christmas 1999, after nearly four years forward deployed.

The Guardrail example demonstrates how quickly requirements can be developed and solutions delivered. Unfortunately, this is the exception rather than the rule. While some high profile requirements documents, like the Future Combat System and the Stryker, have made it through the Army requirements process in a timely manner, less visible requirements tend to take much longer. Two examples I am personally familiar with are the effort to modernize military demolitions and the Aerial Common Sensor.

Following the Chief of Staff of the Army (CSA) announcement in October 1999, the Army rapidly began developing the concept for the Interim Force. At the same time, planning was underway for the Military Operations in Urban Terrain (MOUT) Advanced Concept Technology Demonstration (ACTD). Preparations for the ACTD and the initial training of the first Stryker Brigade Combat Team highlighted the need to modernize military demolitions to support future operations. The interim and objective force concepts postulate an increase in urban operations and call for providing precise effects. Decisive operations are conducted dismounted. Current military demolitions are heavy, bulky, and use World War II era technology. They are not suited for use in dismounted and urban operations or for generating precise effects. The need for modernization was obvious.

In the fall of 2000, a partnership was formed between the Engineer School and the Project Manager for Mines, Countermine, and Demolition to develop a plan for future demolitions.[60] An Integrated Concept Team (ICT) was chartered by the Commandant of the Engineer School in accordance with TRADOC PAM 71-9 to analyze the requirements for military demolitions to support the legacy, interim and objective forces.[61] The ICT membership included representatives from the infantry and special operations proponents, the United States Marine Corps, the United States Air Force, the Project Manager, the Industrial Operations Command, the Combat Training Centers and the Engineer School doctrine, training and combat developments staff. The first meeting was held on 15 February 2001. Initial efforts concentrated on conducting a mission area analysis and a mission needs analysis in accordance with CJCSI 3170.[62] The analysis was done using the tasks in the legacy force and interim force Mission Training Plans. The intent was to determine the adequacy of the current materiel and procedures by highlighting shortfalls across the domains of doctrine, training, leader development, organization, materiel and soldiers (DTLOMS).[63] The analysis showed that some capability improvement was possible without new materiel solutions, particularly from changes in training and procedures. The analysis also clearly showed the need for new materiel solutions to provide lighter, more precise and more versatile demolitions.

Shortly after the ICT began working, the CSA announced the return of requirement document approval to DA level. This was followed within a month by implementing instructions from the Deputy Chief of Staff for Operations (DCSOPS) at the Department of the Army. The DCSOPS implementing guidance required a request be forwarded to DA to initiate an ORD for a new system.[64] Despite extensive coordination with both DA and TRADOC staff officers, there was no clear process for gaining approval to write an ORD. In the absence of guidance, the ICT developed an extensive white paper containing the results of the analysis. The white paper was forwarded to TRADOC in April 2002 along with an update to an existing Mission Needs Statement for Tactical Explosives and a request to develop an ORD for a tactical explosives system to support the interim and objective forces. TRADOC responded in September 2002 with a requirement to submit a request to develop an ORD using a new format based on unpublished interim guidance. In October 2002, the request was updated to a requirement to submit an Operational and Organizational Concept in accordance with guidance in soon to be published TRADOC PAM 71-9. This requirement was formalized in a memorandum from TRADOC clarifying yet again the procedures for development of requirements.[65] An Operational and Organizational Concept was developed, but in mid-December 2002 the requested documentation changed again. The new guidance required a draft of the first two

paragraphs of the proposed ORD. At this writing, more than three years after the announcement of the Interim Force, the need for modern demolitions to support legacy, interim and objective force operations is not documented. In fact, the request to develop documentation of the need is still pending at the action officer level.[66] In spite of extensive study efforts and major manpower expenditures, this critical requirement is awaiting a path forward through a continuously changing system.

Aerial Common Sensor (ACS) provides an example of a recognized objective force requirement that is stuck in the current lengthy approval process.[67] ACS will provide multiple types of intelligence from an airborne platform in support of the development of situational understanding. ACS replaces the Guardrail Common Sensor and Airborne Reconnaissance Low systems in use today. The initial ACS ORD was approved in October 1997 and resulted in funding for the ACS program beginning in FY99. The ACS program began with a Concept Exploration phase that fiscal year. The PM office, the TRADOC System Manager (TSM), and the System Integrator in the DA Deputy Chief of Staff, Operations began the process of updating the ORD in March 1999. A DA Study Advisory Group was formed to oversee the development of a formal mission needs analysis, requirements analysis, and analysis of alternatives. This was followed by the efforts of an Integrated Concept Team led by the TSM to draft and staff the updated ORD. The Commandant of the Military Intelligence School forwarded the ORD to TRADOC in January 2001. The DA Study Advisory Group approved the analysis of alternatives in September 2001. This phase took two and a half years (March 1999 to September 2001). Despite conducting in-depth studies and gaining approval from a department level advisory group, the ORD was in staffing at TRADOC for 21 months and was not forwarded to DA until November 2002. Nearly four years after the initial work began on updating the ORD for this objective force system, the ORD is still not approved. Frequently the acquisition process is blamed for the inability to rapidly leverage technology in military systems, but ACS provides an example where much of the development time was spent in the bureaucracy of developing and approving the requirement.

CONCLUSIONS AND RECOMMENDATIONS

The current Army requirements generation system requires complete re-engineering. As the examples cited here illustrate, the existing system is duplicative, is not tailored for systems of different levels of complexity, is inadequately resourced and is not responsive. The system, especially the multiple levels of documentation and approval, insures that all documents take an extended period of time and extensive manpower for approval. Major changes are required in

organization and process to provide a functioning system appropriate to support the ongoing transformation.

Recent briefings from TRADOC on the requirements generation process[68] focus on developing integrated systems across the Army. The briefings talk explicitly to measuring success across the concept, not just to the standards of a particular branch or proponent. To enable this, a significant amount of planning at the joint and DA level is required to change the process and organization for requirements generation. To achieve a system of systems solution, use of a systems engineering approach is needed to develop system architectures from the top down. The systems engineering process would allocate capability development to subordinate systems in a system of systems. These allocated requirements then form the basis of the requirements for the subordinate systems and in turn guide the development of solutions.

The vast majority of the combat developments resources are currently part of proponent schools. If an integrated system of systems is the desired goal, consideration should be given to the consolidation of the assets under a common chain of command. This would move the focus to development of systems within the overarching systems architecture without the encumbrance of branch politics. The current branch proponent, bottom up process does not encourage an integrated view of each system in the context of the system of systems. Using branch proponents encourages the development of solutions within a branch with interoperability and integration with other systems checked as the requirement is flowed up the approval chain. A re-engineered system should flow the requirements from the top down and design interoperability and integration with other systems in as a baseline during development. In addition, due to the reduction of combat developments manning over the past ten years, proponent school DCDs lack needed skills and personnel.

In order to organize the combat developments force structure to support transformation and development of a system of systems, I recommend consolidation of combat developments assets in a field operating agency reporting to the Department of the Army Deputy Chief of Staff for Operations, G3. The current combat developments organization based around branch proponents requires a tremendous overhead with each school requiring an analysis cell, a support infrastructure in their Directorate of Combat Developments and allocation of a significant work effort to coordination with the other schools, TRADOC Headquarters and the DA staff. Consolidation of the analytic and operational experience spread across the country in the various DCDs, Battlelabs, TSMs and the TRADOC Headquarters, would reduce overhead while providing a robust staff to perform the systems engineering functions and develop the concepts, overarching architectures, supporting analytics, and a prioritized work effort required

to support Army transformation. Further, this staff would be directly linked to the DA staff thereby improving the integration of the DA managed PPBS and Acquisition Systems with the requirements generation system.

Consolidation of combat developments functions under the DA G3 would remove TRADOC Headquarters and the branch schools from the direct chain of responsibility for requirements. The approval process at TRADOC Headquarters essentially duplicates the process at the Department of the Army, serving only to add an additional level of bureaucracy. My proposal also addresses two of the major concerns cited by the Congress, an unrealistic process with too many contributors and the fractionalization by branch seen in the requirements development process. Use of the current bottom up approach to requirements development does not build in the integrated systems approach demanded by the objective force and delegates prioritization of effort to the proponent schools. Consolidation in a DA field operating agency under the G3 would allow the Army to prioritize the development of requirements in conjunction with the DA level prioritization done in the PPBS process. Making these changes would align requirements generation responsibility with primary responsibility for PPBS and acquisition at the DA level.

My paper is concerned with the requirements generation process as it pertains to the development of materiel solutions. Clearly, this proposal must be considered in the context of all the domains of Doctrine, Organizations, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF).[69] The development of integrated solutions across all these domains remains crucial. In order to synchronize these activities, DA direction would be required across the program. Rather than being a disadvantage, however, this is more likely an advantage. TRADOC, while tasked with the lead in the combat developments process today, is not the lead for all of the DOTLMPF domains. Clearly, TRADOC has the Army lead for doctrine development, training development, and leader development. On the other hand, personnel, facilities and organization are managed at the DA level, albeit organizational design development work is done within TRADOC. Even in those domains where TRADOC is the lead, resourcing decisions made at the DA level have a significant impact, e.g. the impact of the Training Program Evaluation Group (PEG) on resources for training. The DA G3 already has the mission of acting as the DA level requirements proponent and is responsible for developing the Army priorities. Given the need for integrated solutions across the domains, the development of a field operating agency reporting to the DA G3 would simplify the process and provide unity of command. This would force the DA staff to provide the top down direction required to develop a system of systems. Restructuring into a DA field operating agency

would release resources to both improve the requirements generation process and allow TRADOC to focus more on their other missions. Finally, with requirements flowing from a DA level staff unencumbered by parochial branch interests, truly integrated solutions could be developed by soldiers and civilians owing allegiance to the greater Army and not to a branch proponent chain of command.

This proposal is not without risk. A major restructuring of this type will impact a number of high paying jobs in congressional districts across the country. In addition, the changes in roles and missions will increase the power of the DA staff while reducing that of TRADOC. Today, the representative of the user in the requirements generation process is TRADOC. Being from outside the department staff, the user representative is unencumbered by the politics of the department headquarters. A field operating agency operating directly under the G3 could be influenced by the department staff to the detriment of the field. As a balance to this, the influence of the combatant commanders and Army major commands should be used to insure appropriate visibility of the needs of the warfighter.

My next recommendation for change is an expedited process for minor changes such as updates for systems already in production, systems requiring re-procurement and minor technical changes such as format changes. Current processes are ambiguous and are often interpreted to require the same level of documentation and analytical support regardless of program complexity, technical risk or acquisition category. The extended process undertaken to update a requirements document to complete a DA directed buy of commercial scoop loaders was not a valuable use of combat developments resources. These resources must be saved for use on higher priority programs with increased risk, complexity and cost. A reasoned review process and tailoring of the requirements generation system, similar to that done for acquisition programs, is required.

Finally, the multiple changes to the system over the past few years insured that nobody really understood the system. Once the change path is decided upon, updating the documentation to provide a clear and understandable process is essential. The current process is slowed by the need to research by trial and error the appropriate process or workaround. Consolidation of assets will aid in this process, but coherent documentation of the process is also required.

Without changes, the Army requirements generation system will not be responsive to the needs of transformation. The examples given in this paper are the norm, not the exception. Change is essential and it must be revolutionary change. More evolutionary change will only add more confusion to the process. Consolidation of combat developments responsibility in a

DA level agency, development of tailored processes, and issuance of coherent, current guidance will provide a system that supports Army transformation. Failure to implement revolutionary change in the requirements generation process will place Army transformation at risk.

WORD COUNT=7619

ENDNOTES

[1] Donald J. Rumsfeld, Quadrennial Defense Review (Washington, DC: U.S. Department of Defense, 30 September 2001), p. 29.

[2] George W. Bush, National Security Strategy (Washington, D.C.: The White House, September 2002).

[3] Richard B. Myers, Draft National Military Strategy (Washington, DC: U.S. Department of Defense, September 2002).

[4] Chairman of the Joint Chiefs of Staff, Requirements Generation System, Chairman of the Joint Chiefs of Staff Instruction 3170.01B (Washington, DC: United States Joint Chiefs of Staff, 15 April 2001), 1.

[5] Rumsfeld, Quadrennial Defense Review, 32.

[6] Congress, House Report 107-298, Department of Defense Appropriations Bill, 2002 and Supplemental Appropriations, 107th Congress, 1st Session, 19 November 2001. Database on-line. Available from Lexis-Nexis. Accessed 15 November 2002.

[7] John M. Donnelly, "Panel Slams Services for Mismanagement," Defense Week, 19 November 2001[database on-line]; available from Lexis-Nexis; accessed 15 November 2001.

[8] See General Accounting Office, Military Transformation: Actions Needed to Better Manage DOD's Joint Experimentation Program (Washington, DC: U.S. General Accounting Office, August 2002), p. 19 and General Accounting Office, Military Transformation: Army has a Comprehensive Plan for Managing Its Transformation, but Faces Major Challenges (Washington, DC: U.S. General Accounting Office, November 2001).

[9] Donald J. Rumsfeld, "Transforming the Military," Foreign Affairs Vol 81, No. 3 (May/June 2002), 26 and Paul Wolfowitz; General Peter Pace; General William Kernan; and Vice Admiral Arthur Cebrowski, USN (Ret.), "Testimony Delivered on Military Transformation," 9 April 2002; available from www.defenselink.mil/speeches/2002/s20020409-depsecdef1.html; accessed 30 Sep 2002.

[10] Richard B. Myers, iv.

[11] General Accounting Office, Military Transformation: Army has a Comprehensive Plan for Managing Its Transformation, but Faces Major Challenges, p. 2.

[12] Andrew Krepinevich, "Defense Transformation", 9 April 2002; available from www.csbaonline.org/4publications/archive/T20020409.defense_transforma/; accessed 27 September 2002.

[13] Michael Vickers, "The 2001 Quadrennial Defense Review, The FY2003 Defense Budget Request and the Way Ahead for Transformation: Meeting the Rumsfeld Test." Available from www.csbaonline/org/4publications/archive; accessed 23 September 2002.

[14] Paul K. Davis, "Transforming the Armed Force: An Agenda for Change," in The Global Century: Globalization and the National Security, (Washington, D.C.: National University Press, 2001), p. 426.

[15] Amy Svitak, "Transform as a Team, Joint Staff tells Services," Army Times 63, no. 12 (14 October 2002), 21.

[16] Rumsfeld, Quadrennial Defense Review, 13-14.

[17]Jason Sherman, "U.S. Moving Toward Top-Down Acquisition," Defense News 18 (January 27, 2003): 6.

[18] See for example E.C. "Pete" Aldridge, "Priorities and Acquisition," speech, Fort Belvoir, VA, PEO/SYSCOM Commander's Conference, 22 November 2002, available at www.ACQ.OSD.mil/DPAP/, accessed 2 January 2003.

[19] Rumsfeld, Foreign Affairs, p. 26 and Wolfowitz, Pace, Kernan, and Cebrowski.

[20] Leona C. Bull, "Pace to Lead Military Transformation Efforts," Journal of Aerospace and Defense Industry News 12 April 2002 [journal on-line];available from www.aerotechnews.com/starc/2002/041202/JROC.html; Internet; accessed 31 January 2003.

[21] Sherman.

[22] Ibid.

[23] Combat Developers serve to formulate and document operational concepts, doctrine, organization and/or materiel requirements. They also serve as the user representative during acquisitions. For more details, see Department of the Army, Materiel Requirements, Army Regulation 71-9 (Washington, DC: US Department of the Army, 30 April 1997),19.

[24] Gerry J. Gilmore, "Crusader Not 'Truly Transformational,' Rumsfeld says", 6 May 2002. Available from www.defenselink.mil/news/May2002/; accessed 22 September 2002.

[25] Ibid.

[26] Chairman of the Joint Chiefs of Staff, Requirements Generation System, 1.

[27] James A. Hawkins, Vice Director, Joint Staff, US Department of Defense, "Changes to the Requirements Generation System." Memorandum for Distribution List. Washington, DC, 7 October 2002.

[28] Ibid.

[29] Chairman of the Joint Chiefs of Staff, Charter of the Joint Requirements Oversight Council, CJCSI 5123.01A (Washington, DC: United States Joint Chiefs of Staff, 8 March 2001).

[30] Acquisition Category I programs are the most expensive programs in the Department of Defense. They receive the highest level of scrutiny. An ACAT I program is a program expected

to exceed either $365 million in research and development funding or $2.19 billion in procurement funding measured in constant (inflation adjusted) Fiscal Year 2000 dollars.

[31] Department of the Army, Materiel Requirements.

[32] Three prominent examples are Joseph M. Cosumano, Assistant Deputy Chief of Staff for Operations and Plans-Force Development, Department of the Army, "Policy for Updating Operational Requirements Documents (ORDs) to Incorporate Interoperability Key Performance Parameter and Cost," Memorandum for Commander, US Army Training and Doctrine Command, Washington, DC, 21 February 2000. Eric K. Shinseki, Chief of Staff, US Army, "Approval of Army Warfighting Requirements," Memorandum for Distribution, Washington, DC, 19 March 2001. Larry R. Ellis, Deputy Chief of Staff for Operations and Plans, Department of the Army, "Approval for Army Warfighting Requirements-Interim Implementation Guidance," Memorandum for Distribution, Washington, DC, 12 April 2001.

[33] US Army Training and Doctrine Command, Force Development Requirements Determination, TRADOC Pamphlet 71-9 (Fort Monroe, VA: US Army Training and Doctrine Command, 7 November 1997).

[34] Some examples of the multiple documents with clarifying guidance follow. US Army Training and Doctrine Command, Combat Developments Newsletter, (Fort Monroe, VA: US Army Training and Doctrine Command, April 2001). Daniel R. Zannini, Deputy Chief of Staff for Combat Developments, US Army Training and Doctrine Command, "Policy for Updating Operational Requirements Documents," Memorandum for Distribution. Fort Monroe, VA, 22 May 2000. Allan M. Resnick, Assistant Deputy Chief of Staff for Developments, US Army Training and Doctrine Command, "Development and Approval of Army Warfighting Requirements," Memorandum for Distribution, Fort Monroe, VA, 31 May 2002.

[35] Eric K. Shinseki, Chief of Staff, US Army, "Approval of Army Warfighting Requirements," Memorandum for Distribution, Washington, DC, 19 March 2001.

[36] Larry R. Ellis, Deputy Chief of Staff for Operations and Plans, Department of the Army, "Approval for Army Warfighting Requirements-Interim Implementation Guidance," Memorandum for Distribution, Washington, DC, 12 April 2001.

[37] The 2001 draft TRADOC Pamphlet 71-9 is available on the Internet at www.tradoc.army.mil/dcscd/71-9%202001%20draft.htm. Last accessed on 8 February 2003.

[38] US Army Training and Doctrine Command, Guide for Development of Army Operational Requirements Documents (ORDs), (Fort Monroe, VA: US Army Training and Doctrine Command, 24 October 2002).

[39] John Hegle <heglej@wood.army.mil>, "Re: Army Requirements System," Electronic mail message with attached briefing slides sent to COL Harold Greene <Harold.greene@carlisle.army.mil>, 15 Aug 02.

[40] Frank B. Campbell, JROC Secretary, Joint Staff, US Department of Defense, "Policy for Updating Operational Requirements Documents (ORDs) to Incorporate Interoperability Key Performance Parameter (KPP) and Cost," Memorandum for Distribution List, Washington, DC, 16 November 1999.

[41] Joseph M. Cosumano, Assistant Deputy Chief of Staff for Operations and Plans-Force Development, Department of the Army, "Policy for Updating Operational Requirements Documents (ORDs) to Incorporate Interoperability Key Performance Parameter and Cost," Memorandum for Commander, US Army Training and Doctrine Command, Washington, DC, 21 February 2000.

[42] Henry G. Franke, III, Director of Combat Developments, US Army Maneuver Support Center, "Request for Exception to Policy for Updating Operational Requirements Documents," memorandum for Office of the Deputy Chief of Staff for Operations and Plans, US Army, Fort Leonard Wood, MO, September 2000.

[43] Ibid.

[44] Daniel R. Zannini, Deputy Chief of Staff for Combat Developments, US Army Training and Doctrine Command, "Policy for Updating Operational Requirements Documents," Memorandum for Distribution. Fort Monroe, VA, 22 May 2000.

[45] William M Bransford, Contractor support to TRADOC Deputy Chief of Staff, Developments and former Division Chief in TRADOC Combat Developments, telephone interview by author, 25 November 2002.

[46] The information on ULCANS was provided by Mr. Donald Henderson of the Maneuver Support Center (MANSCEN) Directorate of Combat Developments (DCD) via the email noted below. In addition, the author is relying on personal notes from his assignment as the Assistant Director for Acquisition, MANSCEN DCD from September 2000 to June 2002. Donald Henderson hendersd@wood.army.mil, "FW: My Timelines for ULCANS," electronic mail message to COL Harold Greene harold.greene@carlisle.army.mil, 26 November 2002.

[47] Ellis.

[48] US Army Training and Doctrine Command, Combat Developments Newsletter, (Fort Monroe, VA: US Army Training and Doctrine Command, April 2001).

[49] Carl H. Builder, The Masks of War (Baltimore, MD: Johns Hopkins University Press, 1989), p. 109.

[50] William H. Adams, Technical Director, US Army Maneuver Support Center Directorate of Combat Developments, "Staffing levels for Combat Developments at Maneuver Support Center Over Time" provided via Facsimile transmission, 7 November 2002.

[51] Sharon Hebenstreit hebenstreits@wood.army.mil, "Historical Info," electronic mail message to COL Harold Greene Harold.greene@carlisle.army.mil, 13 December 2002.

[52] Based on the author's experience while assigned as the Assistant Director for Acquisition in the Maneuver Support Center Directorate for Combat Developments.

[53] Hebenstreit.

[54] William Adams, adamswh@wood.army.mil, "Re: Draft Paper," electronic mail message to COL Harold Greene Harold.greene@carlisle.army.mil, 24 February 2003.

[55] The author while assigned as the Assistant Director for Acquisition of the MANSCEN Directorate of Combat Developments worked on the scoop loader requirement. The information used here is from the author's personal notes.

[56] John Hegle <heglej@wood.army.mil>, "Draft Paper," Electronic mail message sent to COL Harold Greene <Harold.greene@carlisle.army.mil>, 20 February 2003.

[57] Department of the Army, Materiel Requirements, p.7.

[58] The author served as the Product Manager for the Guardrail system from 1998-2000. The information on the Guardrail satellite relay program came from the author's notes and recollections.

[59] Department of the Army, Materiel Requirements, 8.

[60] The information on demolitions modernization is based on the author's recollections from his service as the Assistant Director for Acquisition in the Maneuver Support Center (MANSCEN) Directorate of Combat Developments (DCD) from September 2000 until June 2002 and coordination with SFC (Retired) Jeff Venus. The author was the lead for the Demolitions and Engineer Munitions Integrated Concept Team (ICT). The ICT was charged with developing the modernization plan and associated requirements documents for demolition modernization. SFC Venus was the action officer for demolitions in the MANSCEN DCD. The timelines shown here are from an electronic mail message from SFC (Ret) Venus. Jeff Venus venusj@wood.army.mil, "Request for Information," electronic mail message to COL Harold Greene harold.greene@carlisle.army.mil, 15 November 2002.

[61] US Army Training and Doctrine Command, Force Development Requirements Determination, 15-16.

[62] Chairman of the Joint Chiefs of Staff, Requirements Generation System, B1-B2, C1.

[63] The acronym DTLOMS was recently replaced by the acronym DOTMLPF (Doctrine, Organizations, Training, Materiel, Leadership and Education, Personnel, and Facilities) within the Army. DOTMLPF is used in joint literature. At the time ICT was meeting, the Army still relied on the DTLOMS acronym

[64] Shinseki and Ellis.

[65] Allan M. Resnick, Assistant Deputy Chief of Staff for Developments, US Army Training and Doctrine Command, "Development and Approval of Army Warfighting Requirements – Implementation Guidance," Memorandum for Distribution, Fort Monroe, VA, 18 November 2002.

[66] Jeff Venus venusj@wood.army.mil, "Re: Request for Information," electronic mail message to COL Harold Greene harold.greene@carlisle.army.mil, 24 January 2003.

[67] The author served as Product Manager, Aerial Common Sensor. In this role, he managed the acquisition efforts on the Aerial Common Sensor, Guardrail and Airborne Reconnaissance Low programs. Timelines on the ACS ORD development were provided by Mr. Lee Isle, a member of the TRADOC Systems Manager office that is responsible for the ACS requirements document. Lee Isle lee.isle@hua.army.mil, "RE: Request for Information,"

electronic mail message with attached briefing on ACS ORD Update to COL Harold Greene harold.greene@carlisle.army.mil, 13 December 2002.

[68] See for examples Allan Resnick, "Transforming Requirements Generation," Briefing slides presented to the Annual PEO/PM Workshop, Fort Monroe, VA, US Army Training and Doctrine Command, 6 Aug 2002. Allan Resnick, "Requirements Determination Process: Briefing to the US Army War College," Briefing slides, Fort Monroe, US Army Training and Doctrine Command, 31 October 2002. Cited with permission of Mr. Resnick.

[69] DOTMLPF is introduced in CJCSI 3010.02A, Joint Vision Implementation Master Plan. Formerly, the Army used the acronym DTLOMS to describe similar domains used for analysis of requirements. See Chairman of the Joint Chiefs of Staff, Joint Vision Implementation Master Plan (JIMP), CJCSI 3010.02A (Washington, DC: United States Joint Chiefs of Staff, 15 April 2001), 1.

BIBLIOGRAPHY

Adams, William H, Technical Director, US Army Maneuver Support Center Directorate of Combat Developments. "Staffing levels for Combat Developments at Maneuver Support Center Over Time" provided via Facsimile transmission, 7 November 2002.

Adams, William H adamswh@wood.army.mil. "Re: Draft Paper." Electronic mail message sent to COL Harold Greene Harold.greene@carlisle.army.mil. 24 February 2003.

Aldridge, E.C. "Pete". "Priorities and Acquisition." Speech. Fort Belvoir, VA, PEO/SYSCOM Commander's Conference, 22 November 2002. Available at www.acq.osd.mil/DPAP/, accessed 2 January 2003.

Bransford, William M, Contractor support to TRADOC Deputy Chief of Staff, Developments and former Division Chief in TRADOC Combat Developments. Telephone interview by author, 25 November 2002.

Builder, Carl H. The Masks of War. Baltimore, MD: Johns Hopkins University Press, 1989.

Bull, Leona C. "Pace to Lead Military Transformation Efforts." Journal of Aerospace and Defense Industry News 12 April 2002. Journal on-line. Available from www.aerotechnews.com/starc/2002/041202/JROC.html. Internet. Accessed 31 January 2003.

Bush, George. The National Security Strategy of the United States of America. Washington, DC: The White House, September 2002.

Campbell, Frank B., JROC Secretary, Joint Staff, US Department of Defense. "Policy for Updating Operational Requirements Documents (ORDs) to Incorporate Interoperability Key Performance Parameter (KPP) and Cost." Memorandum for Distribution List. Washington, DC, 16 November 1999.

Chairman of the Joint Chiefs of Staff. Requirements Generation System. CJCSI 3170.01B. Washington, DC: United States Joint Chiefs of Staff, 15 April 2001.

Chairman of the Joint Chiefs of Staff. Charter of the Joint Requirements Oversight Council. CJCSI 5123.01A. Washington, DC: United States Joint Chiefs of Staff, 8 March 2001.

Chairman of the Joint Chiefs of Staff. Joint Vision Implementation Master Plan. CJCSI 3010.02A. Washington, DC: United States Joint Chiefs of Staff, 15 April 2001.

Cosumano, Joseph M, Assistant Deputy Chief of Staff for Operations and Plans-Force Development, Department of the Army. "Policy for Updating Operational Requirements Documents (ORDs) to Incorporate Interoperability Key Performance Parameter and Cost." Memorandum for Commander, US Army Training and Doctrine Command. Washington, DC, 21 February 2000.

Davis, Paul K. "Transforming the Armed Force: An Agenda for Change," in The Global Century: Globalization and the National Security, (Washington, D.C.: National University Press, 2001), p. 423-442.

Donnelly, John M. "Panel Slams Services for Mismanagement." 19 November 2001. Database on-line. Available from Lexis-Nexis. Accessed 15 November 2001.

Ellis, Larry R, Deputy Chief of Staff for Operations and Plans, Department of the Army. "Approval for Army Warfighting Requirements-Interim Implementation Guidance." Memorandum for Distribution. Washington, DC, 12 April 2001.

Franke, Henry G. III, Director of Combat Developments, US Army Maneuver Support Center. "Request for Exception to Policy for Updating Operational Requirements Documents." Memorandum for Office of the Deputy Chief of Staff for Operations and Plans, US Army. Fort Leonard Wood, MO, September 2000.

Gilmore, Gerry J. "Crusader Not 'Truly Transformational,' Rumsfeld Says." 16 May 2002. Available from www.defenselink.mil/news/May2002/. Accessed 22 September 2002.

Hawkins, James A., Vice Director, Joint Staff, US Department of Defense. "Changes to the Requirements Generation System." Memorandum for Distribution List. Washington, DC, 7 October 2002.

Hegle, John heglej@wood.army.mil. "Re: Army Requirements System." Electronic mail message with attached briefing slides sent to COL Harold Greene Harold.greene@carlisle.army.mil. 15 August 02.

Hegle, John heglej@wood.army.mil. "Draft Paper." Electronic mail message sent to COL Harold Greene Harold.greene@carlisle.army.mil. 20 February 2003.

Hebenstreit, Sharon hebenstreits@wood.army.mil. "Historical Info." Electronic mail message sent to COL Harold Greene Harold.greene@carlisle.army.mil. 13 December 2002.

Henderson, Donald hendersd@wood.army.mil. "FW: My Timelines for ULCANS." Electronic mail message with attached briefing slides sent to COL Harold Greene Harold.greene@carlisle.army.mil. 26 November 2002.

Ilse, Lee lee.isle@hua.army.mil. "Re: Request for Information." Electronic mail message with attached briefing slides sent to COL Harold Greene Harold.greene@carlisle.army.mil. 13 December 2002.

Krepinevich, Andrew. "Defense Transformation." Prepared testimony for Congress, 9 April 2002. Available from www.csbaonline.org/4publications/archive/T.20020409.Defensetransforma/. Accessed 27 September 2002.

Myers, Richard B. Draft National Military Strategy (Washington, DC: U.S. Department of Defense, September 2002).

Resnick, Allan M., Assistant Deputy Chief of Staff for Developments, US Army Training and Doctrine Command. "Development and Approval of Army Warfighting Requirements." Memorandum for Distribution. Fort Monroe, VA: 31 May 2002.

Resnick, Allan. "Transforming Requirements Generation." Briefing slides presented to the Annual PEO/PM Workshop, Fort Monroe, VA: US Army Training and Doctrine Command, 6 Aug 2002.

Resnick, Allan. "Requirements Determination Process: Briefing to the US Army War College." Briefing slides, Fort Monroe: US Army Training and Doctrine Command, 31 October 2002. Cited with permission of Mr. Resnick.

Resnick, Allan M., Assistant Deputy Chief of Staff for Developments, US Army Training and Doctrine Command. "Development and Approval of Army Warfighting Requirements – Implementation Guidance." Memorandum for Distribution. Fort Monroe, VA: 18 November 2002.

Rumsfeld, Donald H. Quadrennial Defense Review Report. Washington, DC: Department of Defense, 30 September 2001.

Rumsfeld, Donald H. "Transforming the Military," Foreign Affairs, Vol. 81, no. 3 May/June 2002, pp. 20-32.

Sherman, Jason. "U.S. Moving Toward Top-Down Acquisition." Defense News, 27 January 2003, 6.

Shinseki, Eric K, GEN, Chief of Staff, US Army. "Approval of Army Warfighting Requirements." Memorandum for Distribution. Washington, DC, 19 March 2001.

Svitak, Amy. "Transform as a Team, Joint Staff tells Services," Army Times, Vol 63, no. 12 (14 October 2002): 21.

US Army Training and Doctrine Command. Force Development Requirements Determination. TRADOC Pamphlet 71-9. Fort Monroe, VA: US Army Training and Doctrine Command, 7 November 1997.

US Army Training and Doctrine Command. 2001 Final Draft Force Development Requirements Determination. TRADOC Pamphlet 71-9. Fort Monroe, VA: US Army Training and Doctrine Command, 16 November 2001. Available on the Internet at www.tradoc.army.mil/dcscd/71-9%202001%20draft.htm. Accessed 8 February 2003.

US Army Training and Doctrine Command. Combat Developments Newsletter. Fort Monroe, VA: US Army Training and Doctrine Command, April 2001.

US Army Training and Doctrine Command. Guide for Development of Army Operational Requirements Documents (ORDs). Fort Monroe, VA: US Army Training and Doctrine Command, 24 October 2002.

United States Congress. House. House Report 107-298, Department of Defense Appropriations Bill, 2002 and Supplemental Appropriations. 107th Congress, 1st Session, 19 November 2001. Database on-line. Available from Lexis-Nexis. Accessed 15 November 2002.

US Department of the Army. Materiel Requirements. Army Regulation 71-9. Washington, DC: US Department of the Army, 30 April 1997.

U.S. General Accounting Office. Military Transformation: Army has a Comprehensive Plan for Managing Its Transformation, but Faces Major Challenges. Washington, DC: U.S. General Accounting Office, November 2001.

U.S. General Accounting Office. Military Transformation: Actions Needed to Better Manage DOD's Joint Experimentation Program. Washington, DC: U.S. General Accounting Office, August 2002.

Venus, Jeff venusj@wood.army.mil. "Request for Information." Electronic mail message sent to COL Harold Greene Harold.greene@carlisle.army.mil. 15 November 2002.

Venus, Jeff venusj@wood.army.mil. "Re: Request for Information." Electronic mail message sent to COL Harold Greene Harold.greene@carlisle.army.mil. 24 January 2003.

Vickers, Michael. "The 2001 Quadrennial Defense Review, The FY2003 Defense Budget Request and the Way Ahead for Transformation: Meeting the Rumsfeld Test." 19 June 2002. Available from www.csbaonline.org/4publications/archive. Accessed 23 September 2002.

Wolfowitz, Paul; Pace, Peter; Kernan, William; and Cebrowski, Arthur. "Testimony Delivered on Military Transformation," 9 April 2002; available from www.defenselink.mil/speeches/2002/s20020409-depsecdef1.html; accessed 30 Sep 2002.

Zannini, Daniel R, Deputy Chief of Staff for Combat Developments, US Army Training and Doctrine Command. "Policy for Updating Operational Requirements Documents." Memorandum for Distribution. Fort Monroe, VA, 22 May 2000.